O'BRIEN & GERE
ENGINEERS, INC.

505753 0012
RCRA

November 5, 1993

Ms. Jo Hanson
Monsanto Company
800 North Lindbergh Blvd.
St. Louis, MO 63167

Re: Monsanto John F. Queeny Plant
Building FF Phase II Investigation
File: 2600.024#2

Dear Ms. Hanson:

O'Brien & Gere Engineers, Inc. has completed the Phase II Investigation at Building FF at the Monsanto Company (Monsanto) John F. Queeny Plant. The Phase II Investigation, which included soil and ground water sampling, was completed to further delineate affected soil and ground water observed during the Phase I Investigation, which was conducted to assess the effectiveness of previous remediation efforts at the site. The Phase I analytical results are summarized in Attachment A.

During the Phase II Investigation, nine ground water samples and twelve soil samples were collected from the site and analyzed for tetrachloroethene (PCE) and trichloroethene (TCE) (Figures 1, 2, and 3). Ground water samples were collected using a GEOPROBE sampling device. Two samples were collected from each ground water sampling location. One sample from each location was analyzed for TCE and PCE using a field gas chromatograph (GC). Three duplicate ground water samples were submitted to Savannah Laboratories and Environmental Services, Inc. (Savannah Laboratories) for TCE and PCE analysis by USEPA SW 846 Method 8240. The ground water sample analytical results are summarized in Table 1.

Soil samples were collected from six soil borings completed at the site. One soil boring was advanced using GEOPROBE sampling equipment, and the remaining five soil borings were advanced using conventional hollow stem auger techniques. Two soil samples were collected from each soil boring: one sample was collected from the upper interval of each soil boring (two to four feet below grade), and one sample was collected from the interval exhibiting the highest concentration based on field screening with a photoionization detector (PID). The soil samples were submitted to Savannah Laboratories for PCE and TCE analysis by USEPA SW 846 Method 8240. The soil sample analytical results are summarized in Table 2.

Figures 1, 2, and 3 depict the estimated concentration contours for shallow soil, deep soil, and ground water, respectively, based on the analytical results. The ground water concentration contours suggest that two distinct areas of higher concentrations exist at the site, one south of the alley, which runs east to west and is located north of the former Building FF location, and one north of the alley. However, limited ground water data has been collected north of the alley. Furthermore, the concentrations detected in the ground water north of the alley suggest that constituents may exist in the soil. Currently, soils have not been investigated north of the alley. Based on the available analytical data, O'Brien & Gere Engineers, Inc. is unable to confidently identify the limits of affected soil and/or ground water.

O'Brien & Gere Engineers, Inc., an O'Brien & Gere Company
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Also during the Phase II Investigation, ground water level measurements were collected in four of the existing wells at the John F. Queeny Plant, REC-1, MW#3, MW#4, and MW#19. Using the data obtained from these wells, O'Brien & Gere Engineers, Inc. attempted to assess ground water flow direction across the investigation area within the vicinity of Building FF. However, due to the lack of ground water data north of the alley, O'Brien & Gere Engineers, Inc. is unable to assess accurate ground water flow in this area.

To fill the apparent data gaps noted above and more adequately assess the site, O'Brien & Gere Engineers, Inc. proposes additional investigations to determine the topography of bedrock in the area (and potential nonaqueous phase liquids [NAPLs] in the subsurface), ground water flow direction across the site, and soil conditions. Bedrock may be investigated using a network of cone penetrometers. Following advancement of the penetrometers to the bedrock, temporary piezometers may be installed in the penetrometer borings to provide for ground water level monitoring. The piezometers may be screened at different intervals to allow investigation of the presence of NAPL layers across the site. After the piezometers have been installed, following a suitable recovery period, ground water level measurements could be obtained and ground water samples could be collected from each piezometer.

Following completion of the tasks summarized above and review of the ground water analytical results, O'Brien & Gere Engineers, Inc. proposes that additional soil investigations be completed north of the alley in locations dictated by the ground water analytical results. During advancement of the soil borings, soil samples may be collected for chemical analysis as well as geotechnical analysis. Geotechnical data obtained will be useful in evaluating constituent transport at the site.

O'Brien & Gere Engineers, Inc. appreciates the opportunity to be of continued service to Monsanto. If you have any questions or comments, please do not hesitate to call me at any time.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Julie J. Lowe
Project Engineer

JJL:bah
Attachments
cc: Christopher G. Dorow - Monsanto Company (w/attachments)
Dean L. Palmer, P.E. - O'Brien & Gere Engineers, Inc.
2600.024:HANS1105.LTR

Table 1

Monsanto Company
John F. Queeny Plant
Building FF Phase II Investigation

Summary of Groundwater Analytical Results

Parameter	GP22	GP23	GP24	GP25	GP25D	GP26	GP26D**	GP27	GP28	GP29	GP29D	GP30
Depth to Screen (ft)	9	21	21	24	24	21	21	21	23	21	21	21
Depth to Groundwater in Probe (ft)	7.3	10.8	19.5	11.3	11.3	18.8	18.8	16.2	16.3	12.3	12.3	11.7
PCE (ppb)	ND*	394	3	373202	160000	7388	3200J	1	303	ND	ND	1
TCE (ppb)	ND	35	1	11324	5900	45711	14000	6	33	ND	ND	ND

lot of difference

NOTES

* ND = Not Detected above the method detection limit.

** GP26D also exhibited the following concentrations: Cis-1,2-Dichloroethene - 10000J; Chloroform - 2100J; Toluene - 370000; Chlorobenzene - 10000J.
All concentrations in ppb. J = Estimated quantity below the method detection limit.

Table 2

Monsanto Company
John F. Queeny Plant
Building FF Phase II Investigation

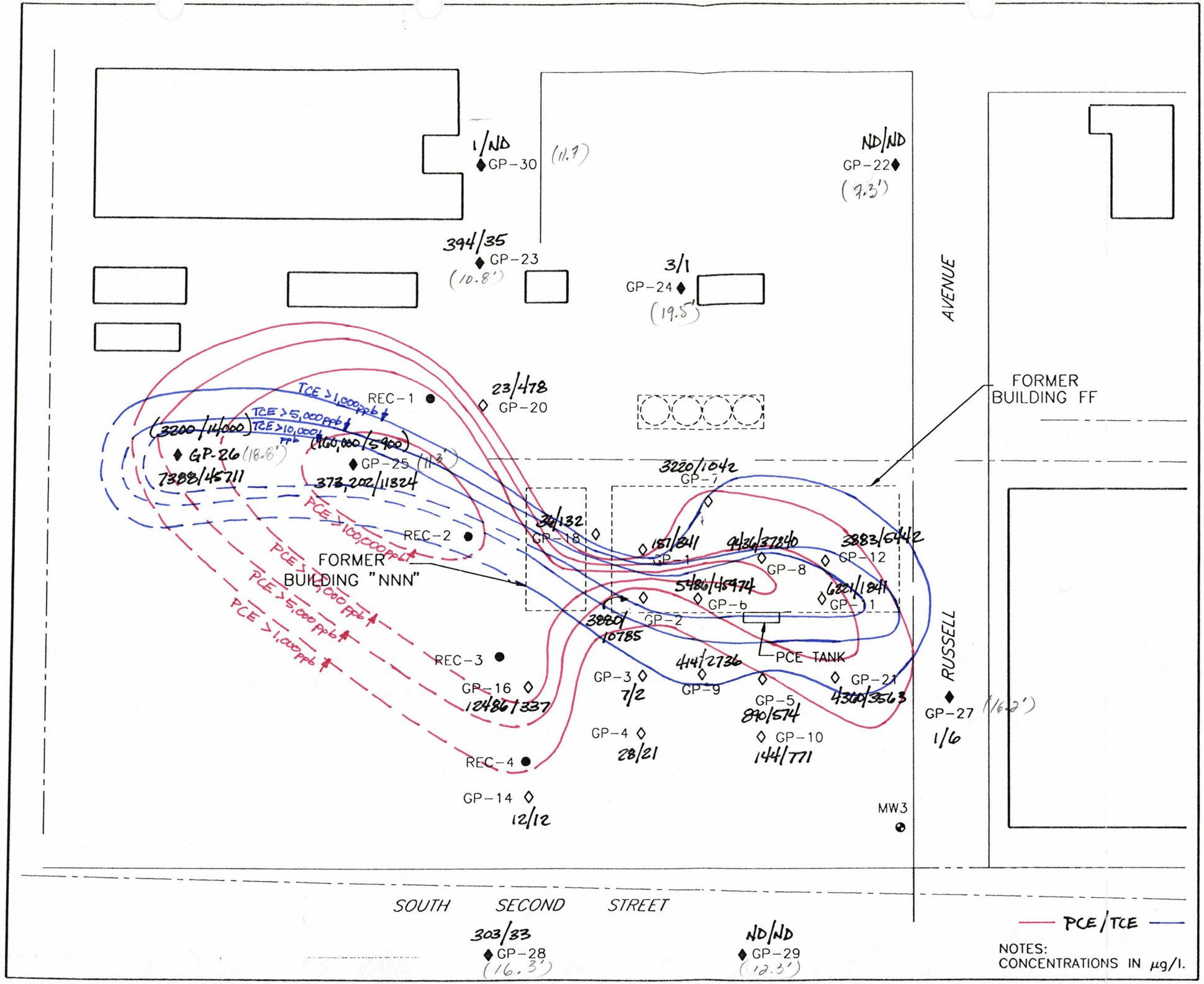
Summary of Soil Analytical Results

Parameter	SB-7	SB-7	SB-8	SB-8	SB-9	SB-9	SB-10	SB-10	SB-11	SB-11	SB-12	SB-12
Depth (ft)	2-4	6-8	3-5	9-11	3-5	11-13	2-4	6-8	5-7	9-11	0-4	4-6
PCE (ppb)	ND*	34	ND	ND	30	9.2	ND	ND	ND	ND	ND	ND
TCE (ppb)	ND	39	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES

* ND = Not Detected above the method detection limit.

FIGURE 1



LEGEND

REC-2	●	EXISTING PRODUCT RECOVERY WELL AND ID
MW3	◒	EXISTING GROUND WATER MONITORING WELL AND ID
GP-4	◇	PHASE I GEOPROBE SAMPLE APPROXIMATE LOCATION AND ID
GP-22	◆	PHASE II GEOPROBE SAMPLE LOCATION AND ID

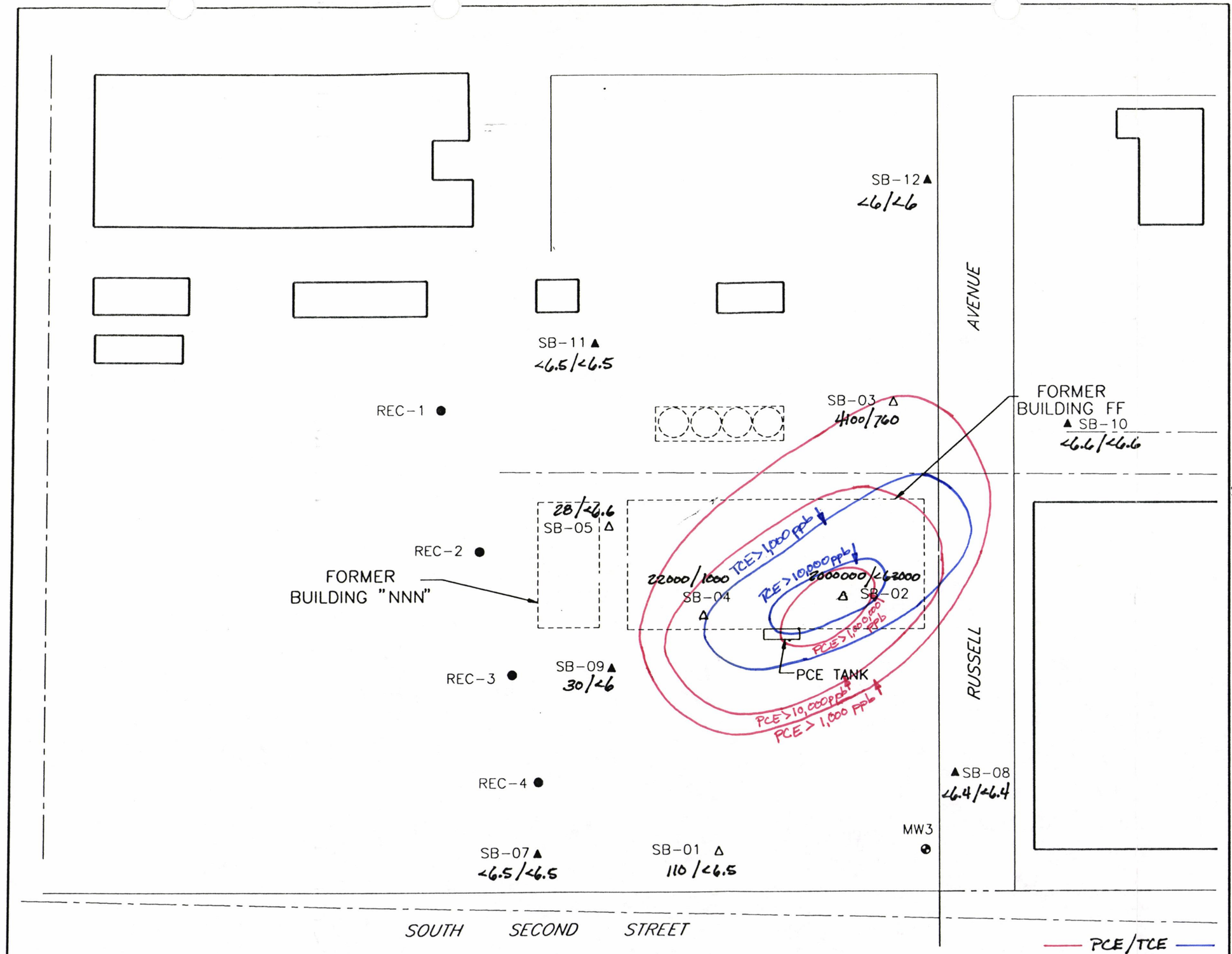
MONSANTO COMPANY
J. F. QUEENY
BUILDING FF
PHASE II INVESTIGATION
GROUND WATER
CONCENTRATION CONTOURS

1" = 40'-0"

FILE NO. 2600.024-05F

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 2



NOTES:
CONCENTRATIONS IN μg/kg.

LEGEND

REC-2	●	EXISTING PRODUCT RECOVERY WELL AND ID
MW3	◕	EXISTING GROUND WATER MONITORING WELL AND ID
SB-12	▲	PHASE II SAMPLE LOCATION AND ID
SB-03	△	PHASE I SOIL SAMPLE APPROXIMATE LOCATION AND ID

MONSANTO COMPANY
J. F. QUEENY
BUILDING FF
PHASE II INVESTIGATION
SHALLOW SOIL
CONCENTRATION CONTOURS
(2' – 4')

1" = 40'-0"

FILE NO. 2600.024-06F

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 3

SB-12 ▲
<6.8/<6.3

AVENUE

SB-11 ▲
<6.8/<6.3

98/<6.8
SB-03 △

REC-1 ●

FORMER
BUILDING FF
▲ SB-10
<6.4/<6.4

8.9/44
SB-05 △

REC-2 ●

FORMER
BUILDING "NNN"

390/<32
SB-04 △

280000/21000
△ SB-02
(3100/<840)

TCE >100,000 ppb

PCE TANK

REC-3 ●

SB-09 ▲
9.2/<6.2

PCE> 100,000 ppb

RUSSELL

REC-4 ●

▲ SB-08
46.2/46.2

PCE > 10,000 ppb

PCE > 1,000 ppb

SB-07 ▲
34/39

SB-01 △
30000/<770

MW3 ◕

SOUTH SECOND STREET

PCE/TCE

NOTES:
CONCENTRATIONS IN μg/kg.

LEGEND

REC-2 ● EXISTING PRODUCT RECOVERY WELL AND ID

MW3 ◕ EXISTING GROUND WATER MONITORING WELL AND ID

SB-08 ▲ PHASE II SAMPLE LOCATION AND ID

SB-03 △ PHASE I SOIL SAMPLE APPROXIMATE LOCATION AND ID

MONSANTO COMPANY
J. F. QUEENY
BUILDING FF
PHASE II INVESTIGATION
DEEP SOIL
CONCENTRATION CONTOURS
(8' – 12')

1" = 40'-0"

FILE NO. 2600.024-07F

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Table 2

Monsanto Company
J.F. Queeny Plant
Building FF
Phase I Investigation

GEOPROBE GROUNDWATER SAMPLING RESULTS
(ug/L)

Sample I.D.	Parameter	
	Trichloroethene	Tetrachloroethene
GP1	341	151
GP2	10,785	3,880
GP3	2	7
GP3 DUP	2	7
GP4	21	28
GP5	574	890
GP6	45,974	5,486
GP7	1,042	3,220
GP8	37,840	9,416
GP9	2,736	414
GP10	771	144
GP11	18,414	6,221
GP12	5,442	3,883
GP14	12	12
GP16	337	12,486
GP18	132	36
GP20	478	23
GP21	3,563	4,360

NOTE:
1) ug/L is equivalent to parts per billion (ppb)

Table 3

Monsanto Company
J.F. Queeny Plant
Building FF
Phase I Investigation

WELL SAMPLING RESULTS
(ug/L)

Sample I.D.	Parameter	
	Trichloroethene	Tetrachloroethene
REC-1	<2,500	61,000
REC-2	<5,000	150,000
REC-3	<5	36
REC-4	570	3,400
MW-3	250	250
DUP	380	3,300

NOTE:
1) ug/L is equivalent to parts per billion (ppb)

Table 4

Monsanto Company
J.F. Queeny Plant
Building FF
Phase I Investigation

SUBSURFACE SOIL SAMPLING RESULTS
(ug/kg)

Sample I.D.	Parameter	
	Trichloroethene	Tetrachloroethene
SB-1 (2'-4')	<6.5	110
SB-1 (10'-12')	<770*	30,000
SB-2 (2'-4')	<63,000*	2,000,000
SB-2 (8'-10')	21,000*	280,000
SB-3 (6.5'-8.5')	760*	4,100
SB-3 (10.5'-12.5')	<6.8	93
SB-4 (2'-4')	1,000*	22,000
SB-4 (8'-10')	<32	390
SB-5 (2.5'-4.5')	<6.6	28
SB-5 (10.5'-12.5')	44	8.9
SB-6 (2'-4') DUP	<840*	3100

* Due to the high concentration of PCE in the sample, a high level extraction was employed which increased reported quantitation limits.

NOTE:
1) ug/kg is equivalent to parts per billion (ppb)